

37 KEYBOARD SEND-RECEIVE (KSR) TELETYPEWRITER SET
USED IN TELEGRAPH TEST BOARDS AND SERVICE BOARDS
INSTALLATION

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1. GENERAL

1.01 This section provides the installation procedure for the 37 KSR (Keyboard Send-Receive) Set (Figure 1) used in the telegraph test board and service board applications. The 37 KSR Set generally conforms to EIA (Electronics Industries Association) Standard RS-232-B for the interface connections. Since the previous issue of this section was not available for general distribution, marginal arrows normally used to indicate changes and additions have been omitted.

1.02 The 37 KSR Set can be installed on a shelf space 17-1/2 inches wide and 11-1/2 inches high and 19 1/2 inches deep. Maximum

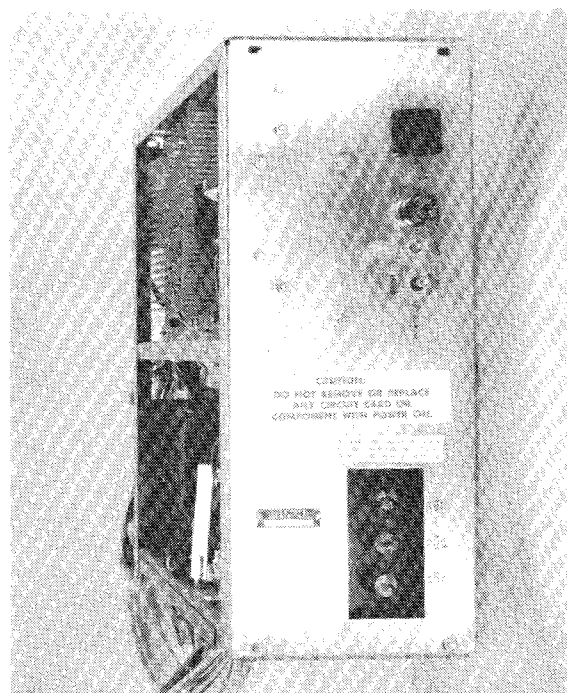
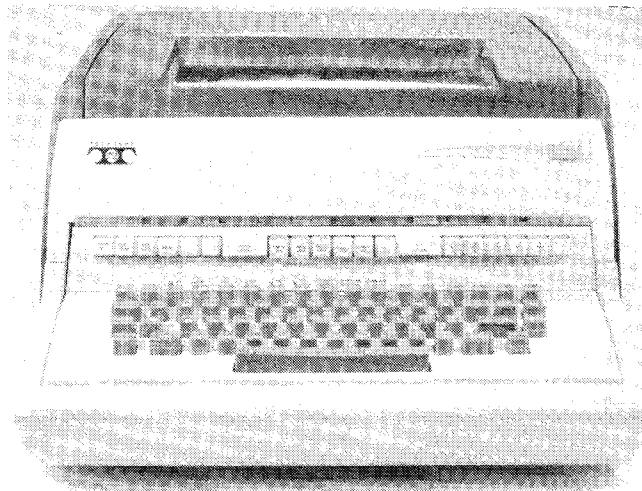


Figure 1 - 37 KSR Teletypewriter Set
Used in Test Board Service

height, and depth of the set, with the printer cover lids open, is 17 inches and 29 inches respectively. The set weighs approximately 115 pounds.

1.03 Reference directions are based on the normal position of the operator facing the keyboard. Left or right, up or down, and front or rear are referenced with the keyboard in front.

1.04 The 37 KSR Set operates under a 3-wire, single-phase 115-volt +10 percent, 60 Hz +0.75 Hz ac power source. The ac receptacle must be located within 8 feet of the installation area and be capable of carrying 15 amperes of current.

Note: The ac receptacle should not be under control of a switch.

1.05 Refer to the wiring diagram package (WDP0283) packed with the set for information concerning wiring and circuit cards. See 574-304-100 for information on the KSR set.

2. UNPACKING

2.01 The 37 KSR Set is disassembled, and shipped in three separate cartons containing the following major components:

- (a) Electrical service unit
- (b) Console assembly with base and motor unit
- (c) Typing unit.

2.02 Unpack each carton carefully to avoid marring paint finishes or losing small parts. Observe all special unpacking instructions associated with each carton.

2.03 The console will be mounted in the teletypewriter position of the DTC (Data Test Center) or Service Board. Before mounting the console check the shelf for rigidity. Any latch present must lock in retracted and extended positions. The electrical service unit shall be remotely mounted.

CAUTION: DO NOT CONNECT AC POWER TO THE SET UNTIL THE INSTALLATION IS COMPLETE AND READY FOR TESTING.

Keyboard and Cover

2.04 Unpack the keyboard and cover assembly which contains the reset mechanism, base, and motor, by opening the top and one side of the carton (Figure 2). Remove all packing materials and slide the assembly out.



Figure 2 - Keyboard and Cover Assembly

CAUTION: DO NOT LIFT ASSEMBLY BY THE KEYBOARD HOUSING.

2.05 Extend the shelf on the Data Test Center to its latched position. Push up on the latches under the shelf before extending the shelf. Place the console with the feet in the depressions of the shelf.

2.06 Open the cover by depressing the two cover latches (one on each side) and tilting the cover upward. Loosen the retaining screws on each side of the control panel and tilt the panel forward. See Figure 7. Avoid removing the cover from the console; if necessary, however, the cover may be removed from the console by the following procedure:

- (1) Reach inside the cover and disconnect the cover balancing arm located on the left side, by sliding the arm until the retaining screw is at its lowest position and moving the arm to the right.
- (2) Disconnect the cable at the copylight connector in the right rear corner of the cover.
- (3) With the cover open to a 45 degree angle, lift the left rear corner of the cover slightly, pull it toward the front and then lift

it free of the hinge. Since part of the cover hinge pin is flat, the cover must be held at 45 degrees before it can be removed.

- (4) Repeat 2.06 (3) for the right hinge, with the cover open to a 45 degree angle.
- (5) Place the cover aside.

Typing Unit

2.07 Unpack the typing unit (Figure 5) from its carton and remove all packing material. The typing unit may be lifted by grasping the right side of the front plate and the rear curve under the left side plate. **DO NOT LIFT ANY OTHER WAY.** Check the feed pawls and vertical positioning mechanism (on side of unit) for packing details. Remove the tie from the print hammer carriage, if present. Check that the 8-row typebox is mounted on the typebox carriage.

2.08 View the typing unit from the top front and check the alignment of the four horizontal positioning clutch trip levers with the codebar forks. See Figure 3. If trip lever is not inside the fork, lift the codebar fork and position the trip lever into the fork. It may be necessary to loosen front plate mounting screws in order to reposition trip levers. Tighten mounting screws.

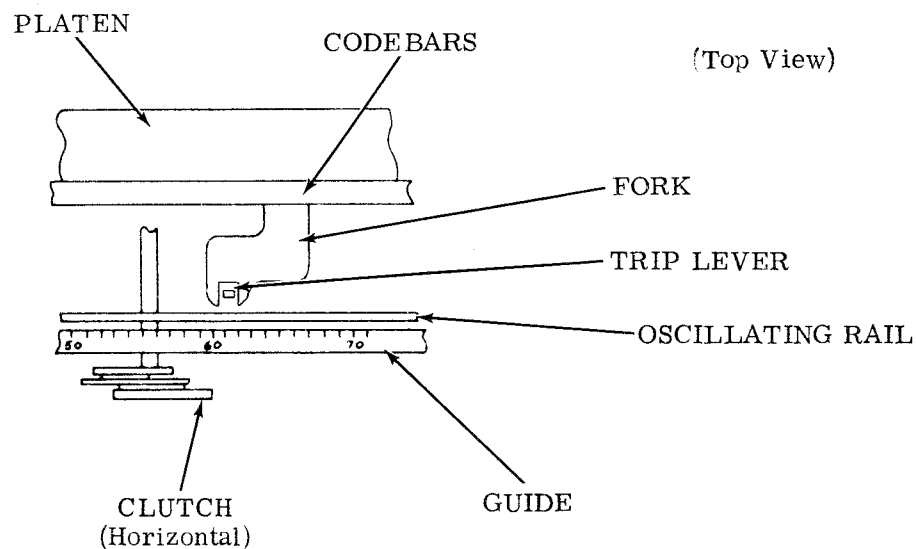


Figure 3 - Codebar Fork and Clutch Trip Lever Alignment

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2.09 View the vertical positioning mechanism on the left side of the typing unit. The retraction reset slide (long thin black bail pivoted in the center) should be positioned in front of the retraction check pawls. If not in front of the pawls, move the retraction reset slide out and around in front of the checkpawls. See Figure 4.

3. LUBRICATION

3.01 Lubricate the unit just prior to placing it in service. After 300 to 500 hours of operation, the unit should be relubricated to make sure all operating points receive lubrication. At this time, all clutch gaps should be rechecked to insure that the clutch gaps, after all parts have seated themselves, have not opened up. Refer to typing unit adjustment Section 574-320-703 for requirements.

3.02 Make visual inspection of the typing unit, keyboard, base, and motor for general lubrication requirements. Check oil locations on felt washers, oil cups, and in most locations where parts rub or move with respect to each other. Grease should be present on gears, rollers, points of heavy pressure, and some ball bearings.

3.03 General requirements for lubrication for the units are as follows:

- (1) Pivot points require two or three drops of oil.

- (2) Felt washers are saturated with oil.
- (3) Cams and sliding surfaces require a film of oil.
- (4) All open roller bearings should be packed with grease (KS7471).

Note: Shielded roller bearings do not require lubrication.

3.04 Overlubrication which would allow oil to drip or grease to be thrown on other parts should be avoided. Excessive lubricants should be removed with a dry lint-free cloth. Keep all electrical contacts free of oil or grease.

3.05 If lubrication is required refer to 574-320-704 for the typing unit, 574-321-704 for the keyboard, and 574-331-100 for the base.

Note: Use maintenance pad TP124828 to protect furniture and floor coverings from oil and grease while lubricating the units.

3.06 In general, the lubrication interval for the KSR set is after the first 300 hours or 4 weeks of service. Thereafter, the set should be lubricated every 1500 hours of operation or 6 months, whichever occurs first.

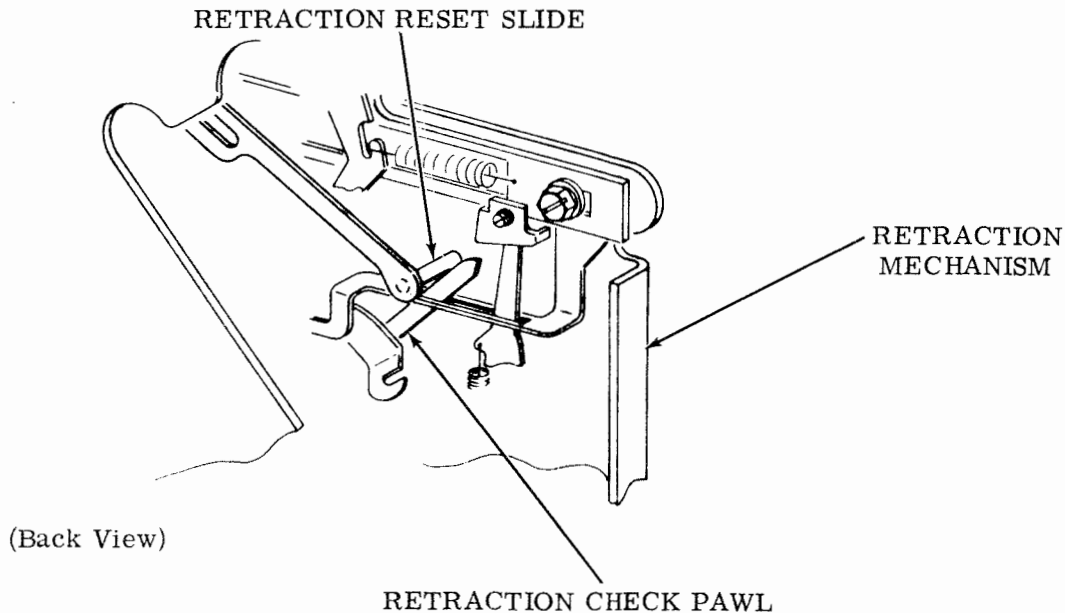


Figure 4 - Retraction Slide and Check Pawl

4. ASSEMBLY PROCEDURE

TYPING UNIT

A. Mounting on Base

4.01 Locate the selector clutch on the right end of the typing unit main shaft, and locate the keyboard reset coupler (Figure 5) at the lower center front. Facing the right end of the typing unit, rotate the selector clutch drum

in a counterclockwise direction until the lugs on the keyboard reset coupler are vertical.

4.02 Viewing the keyboard reset mechanism from the right side of the keyboard, rotate the mechanical reset shaft in a clockwise direction until the open slots in the plastic universal joint member are vertical to receive the lugs on the typing unit (Figures 5 and 6) keyboard reset coupler.

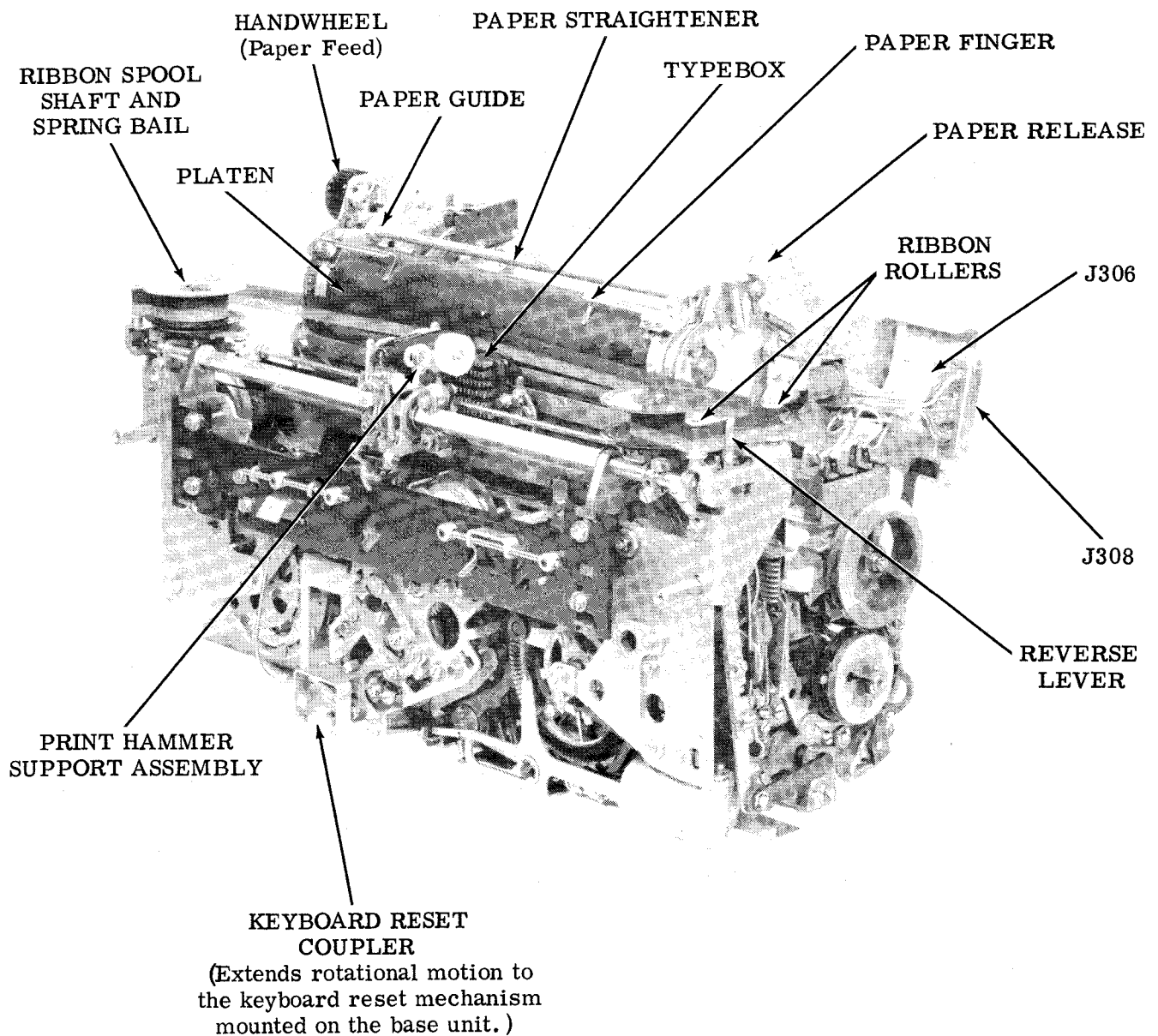


Figure 5 - 37 Typing Unit

4.03 The typing unit may be gripped for lifting by grasping the right corner of the front plate and the rear curve under the left side plate. **DO NOT LIFT ANY OTHER WAY.** From a level position, tilt the typing unit slightly forward (toward the keyboard). Mate the reset coupler of the keyboard reset mechanism (Figure 6) to the typing unit, and carefully lower the typing unit over the locating studs and intermediate gear assembly. Turn the motor fan by hand to be sure that the main shaft driven gear and intermediate gear mesh properly.

4.04 Install the four typing unit mounting screws, starting with the left rear.

B. Interrelated Adjustments

4.05 Keyboard Trip Arm: Adjust the keyboard trip arm as shown in Figure 8. To view the trip arm adjustment requirement, remove the keyboard housing by removing the two cover locating posts and the two screws under the housing.

4.06 The motor, intermediate gear assembly (Figure 6), and the printer main shaft driven gear should rotate freely without friction between the gears.

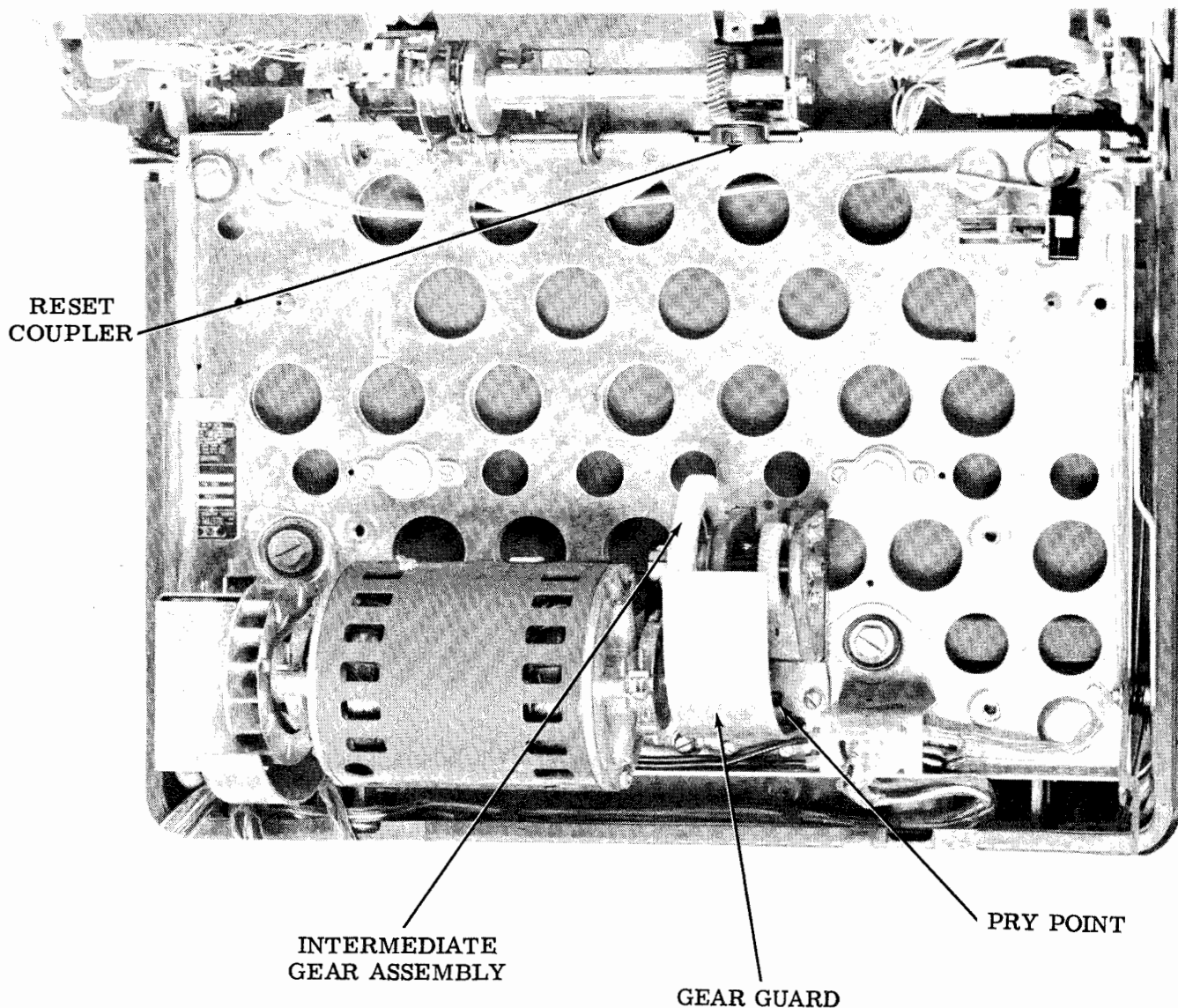


Figure 6 - Base and Motor for KSR Set

4.07 Intermediate Gear Assembly: Remove the gear guard and check for a backlash of 0.004 inch between the main shaft driven gear and the intermediate drive gear. This backlash has a tolerance from 0.004 inch minimum to 0.008 inch maximum. The gears should move freely and mesh properly. If adjustment is necessary, loosen the three intermediate gear assembly mounting screws and the five motor mounting screws friction tight. Move the motor to the rear. Using the pry points at the rear of the intermediate gear assembly (Figure 6), adjust the assembly from front to rear until the requirement is met. Tighten the three intermediate gear assembly mounting screws. Proceed with 4.08 to provide backlash between motor pinion and intermediate gear assembly.

4.08 Motor Unit: Check for a backlash of 0.004 inch between the motor pinion and intermediate driven gear as outlined in the above paragraph. If adjustment is necessary, loosen the five motor mounting screws friction tight. Use the back edge of the base and the motor cradle as a pry point located in front of the left rear mounting screw. Adjust to meet the requirement, tighten the five motor mounting screws, and replace the gear guard.

C. Cable Connection

4.09 Attach the typing unit cable connectors J306 and P308, to the rear of the typing unit.

4.10 Check the cable connections to insure that they are closed and fitted properly. Swing the control panel back and seat the retaining screws, one on each side. Tighten retaining screws.

4.11 Paper Advance and Local Return: With the control panel in its normal position and the typing unit secured to the base, loosen the PAPER ADVANCE and LOCAL RETURN bail eccentric screw locknuts friction tight. Rotate the eccentric until the gap between the paper advance bail, local return bail (on the control panel), and the levers on the typing unit is 0.060 inch minimum (Figure 7). Tighten both nuts. Move the print hammer carriage to the right and check local return operation. The paper advance operation must be checked under power.

4.12 Replace the trim strip with the two mounting screws and center with respect to the control panel. Tighten the screws.

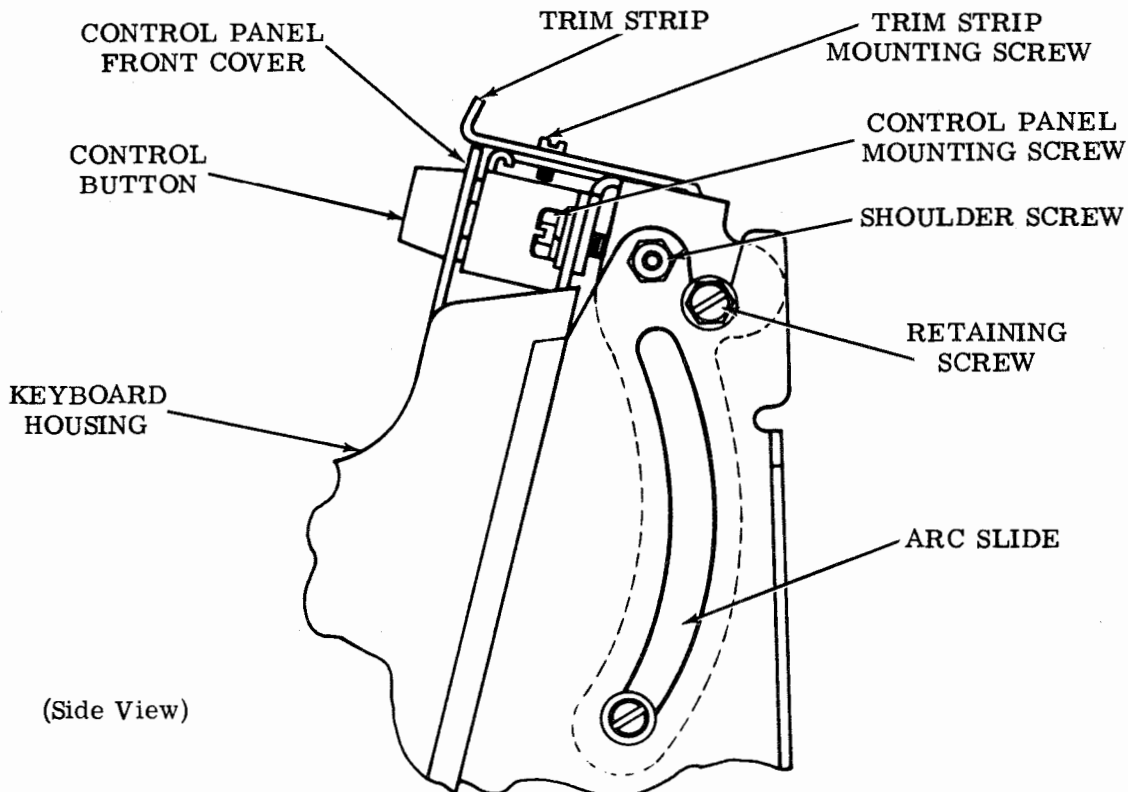


Figure 7 - Control Panel

TRIP ARM (WITH TP337977 GAUGE)

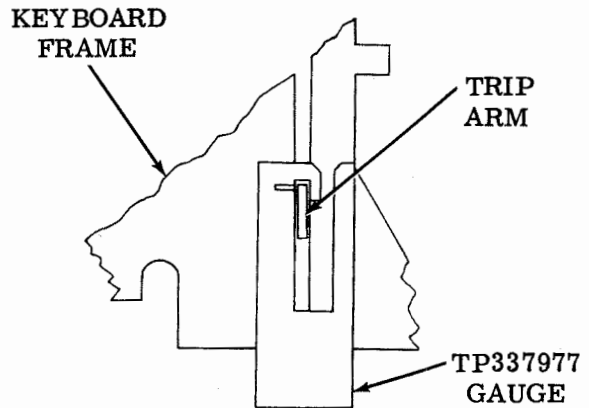
Note: The typing unit must be assembled on the base to make the trip arm adjustment.

To Check

Engage clutch. Rotate clutch until clutch shoe lever and clutch disc stop-lug have cleared the clutch stop arm. Depress trip arm to its latched position. Insert TP337977 gauge over the trip arm so that the top edge of the gauge slot is positioned against the top edge of the trip arm. Rotate cam until the reset bail roller is on the high of the cam. Check both cam lobes, and adjust for least amount of travel.

Requirement

The top surface of the trip arm should be within the width of the grooved line on the front of the gauge. (If grooved lines are present on keyboard frame, disregard them.)



(Front View)

To Adjust

Loosen clamp screw friction tight. Insert screwdriver between upper pry points and rotate plate until trip arm is positioned beyond maximum requirement. Using lower pry points, slowly rotate H-plate until trip arm is positioned to lower grooved line alignment. Tighten clamp screw. Remove gauge. Recycle clutch and recheck requirement.

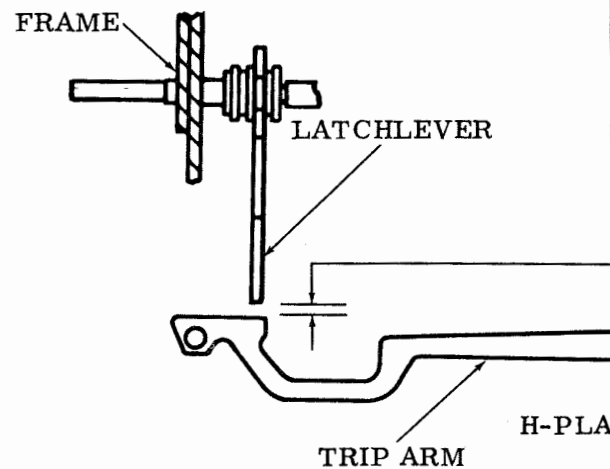
TRIP ARM (WITHOUT TP337977 GAUGE)

To Check

Engage clutch and rotate cam until reset bail roller is on high of cam.

Requirement

Min 0.020 inch---Max 0.050 inch between latchlever and trip arm.



(Right Side View)

To Adjust

Same as with TP337977 gauge except, rotate H-plate until trip arm is positioned to 0.050 inch latchlever clearance.

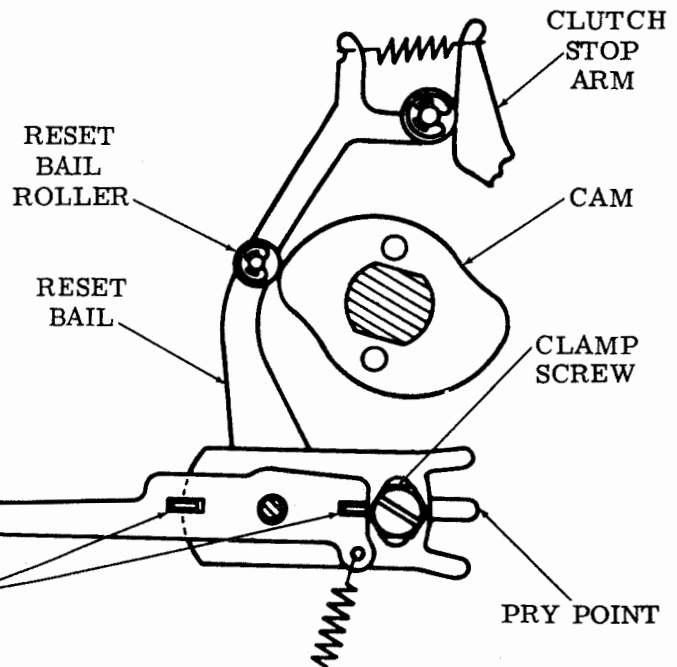


Figure 8 - Keyboard Trip Arm Adjustment

D. Ribbon Routing

4.13 To route the new teletypewriter ribbon, straighten the spring bail and lift the spool off the shaft. Remove the packaging, and reel out enough ribbon to reach the empty spool and for three turns on the spool. Refer to Figures 5 and 9 and perform the following routing procedure.

- (1) Place the spool on the left shaft with the red field on the bottom. Engage the spool shaft pin by turning the spool.
- (2) Thread the ribbon over the guide rollers and through both ribbon guide reversing levers. Keep the ribbon free of twists and in line between the two ribbon guide reversing levers and between the typebox and ribbon guide.
- (3) Position the reversing eyelet, near the ribbon end, between the spool shaft and the ribbon reverse lever.
- (4) Attach the ribbon to the empty spool and install the spool on the shaft.
- (5) Position the ribbon through the ribbon guide that is part of the next character indicator.

(6) Adjust the ribbon tension by turning the ribbon on the spool until the ribbon is tight and under a spring load.

(7) Engage the spool shaft pin and lower the spring bail.

E. Cover Replacement

4.14 Install the cover by tilting the cover back approximately 45 degrees and perform the following:

- (1) Align the hinge pins on the cover with the hinges on the pan. The hinge pins should be behind the springs.
- (2) Push the rear of the cover toward the rear of the base so that the hinge pins fit into the hinge brackets.

Note: Since the hinge pins are flat the cover must be held at about 45 degrees for the pins to fit into the hinge brackets.

- (3) Secure the cover retaining arm on the left side of the cover.
- (4) Attach the 2-pin copylight to the receptacle mounted on the back (right rear corner) of the cover.
- (5) Close the cover; the latches on the left and right side will snap into place.

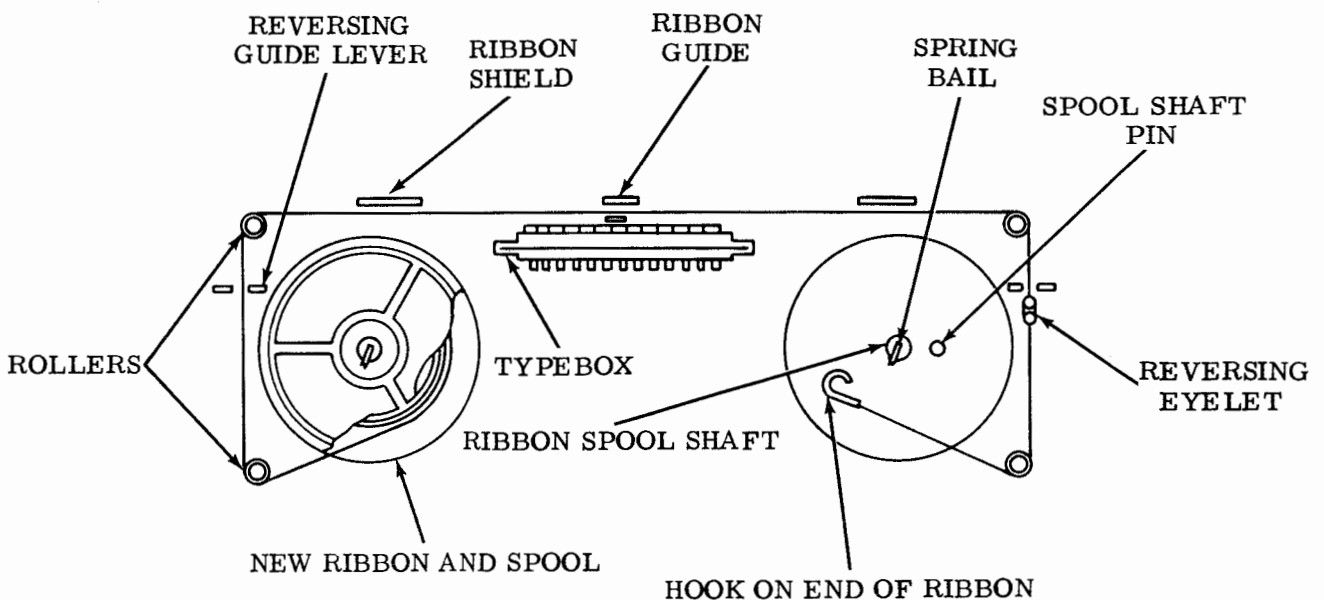


Figure 9 - Ribbon Routing

F. Paper Assembly and Routing

4.15 Open the front lid of the cover by depressing the two latch releases located on top of the lid (Figure 2). Pivot the front lid upward and toward the front and pivot the rear lid upward and toward the rear.

4.16 Insert the paper spindle into the paper roll and install the paper roll into the spindle blocks. Route the paper over the paper

straightener between the two paper guides, refer to Figure 10. Lift the paper finger on the platen and insert the paper between the platen and pressure rollers. Turn the handwheel to move the paper through the platen assembly, leaving three feet of loose paper. Lower the paper fingers on the platen assembly and hold the paper toward the front of the typing unit. Close the rear lid. Close the front lid, and position the paper between the window and the paper guide (be sure that the cover and lids are latched).

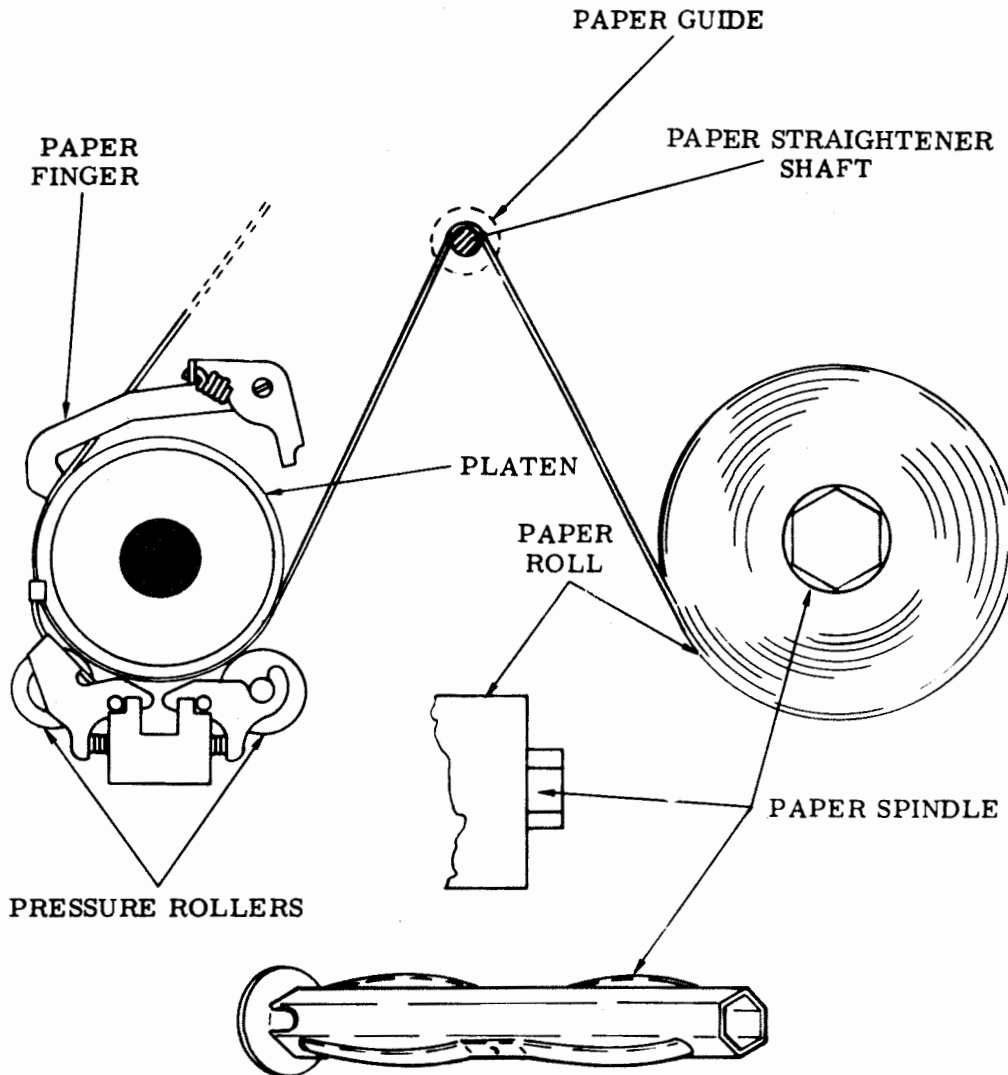


Figure 10 - Paper Routing Assembly

ELECTRICAL SERVICE UNIT

4.17 Carefully unpack the electrical service unit (Figure 11). Refer to the ordering information to check that the desired circuit cards are installed in the electrical service unit. Refer to the CD (circuit description) and the wiring diagrams (WDs) in WDP0283 packed with the set for information concerning the circuit cards. See Table A.

TABLE A

37 — KSR CIRCUIT CARD ARRANGEMENT

CARD	POSITION
Distributor	09
Counter Control	06
Timer Interface	08
Character Counter	10
Receiving Device	207
Keyboard Control	10
Two-Color Ribbon Control	107

4.18 The YESU is mounted either in a rack of the Data Test Center or Service Board, or in a separate location within the limits of the 10-foot long YESU cord. Fasten the YESU in its appropriate mounting location.

4.19 Plug the EIA connector on the YESU cable into cord A which is connected to the J310 connector of the 918A Multispeed and Code Converter. Plug connector J309 into the P309 connector on the rear of the KSR console. Connect cable D from J311 on the rear of console to connector J311 on the 918A converter. Connect the YESU power cord to an adjacent convenience receptacle.

4.20 If the 918A converter is not used in the Data Test Center, connect the YESU EIA plug into the receptacle on the outlet panel of the Data Test Center. Cable A and cable D are not used.

PAPER WINDER

4.21 For paper winder installation in the 904G/H Data Test Center, remove the tall TP338157 display rack that was supplied with the paper winder. Replace it with the shorter rack 840247-126 Guide Assembly using the spring provided on the TP338157 display rack. The guide assembly will mount into the frame of the paper winder.

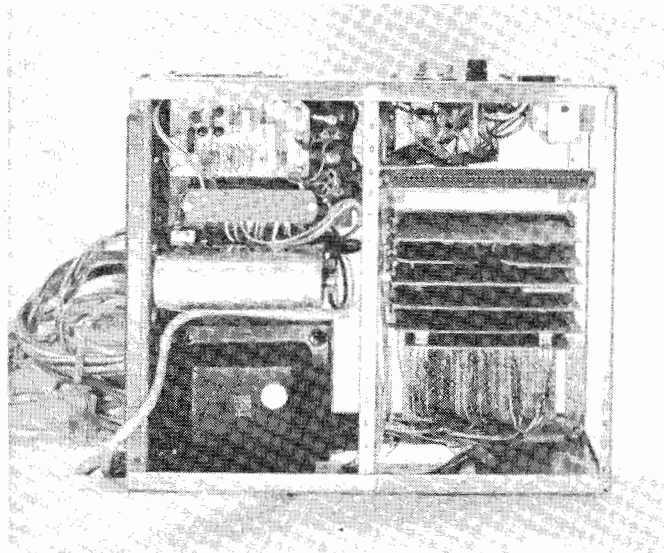


Figure 11 - 37 Electrical Service Unit (YESU)

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4.22 While working from the rear of the DTC, mount the paper winder on the four studs on the upright rear portion of the ED-73390 TTY shelf assembly. Plug the paper winder power cord into a convenience receptacle. Refer to Specification 50704S, included with the paper winder for mercury switch adjustment.

4.23 Pass the copy paper from the typing unit over the display rack under the paper slack bail, and into the spindle of the paper winder. Turn on paper winder motor.

5. CHECKOUT

LOCAL AND ON-LINE TESTS

5.01 Using a KS14234 volt-ohmmeter (or equivalent), check for continuity (1/2-ohm or less) between the round ground prong on the ac power cord and the YESU frame, cabinet pan, motor casing, control panel frame, keyboard base, printer frame, terminal A9 on the YESU wiring field, and terminal 1 of the EIA connector. If there is a lack of continuity, replace the missing or broken ground wire.

5.02 The KSR set can be tested in local and on-line modes by performing designated tests. Refer to the testing information outlined in troubleshooting Section 574-304-300.

5.03 Check all the cable connections and proceed with the local and on-line tests.

Note: Check the ordering information to determine the features and options before conducting the checkout. The tests contained in the troubleshooting section cover all available features and options.

6. INTERFACE UNITS

6.01 The output of the TTY set terminates with an EIA standard interface connector and J311 connector. These connectors extend all related power, control, and signal line circuits to appropriate line interface unit. The line interface unit is installed in the DTC.

6.02 As a final check make sure that the power switch on the YESU is in the NORMAL ON position, the ON LINE LOCAL switch is at ON LINE, and the MOTOR OFF switch on the control panel is not depressed. When the interface units are properly installed and the power cord is connected to a 115-volt source, the keyboard send-receive station is ready for operation.